UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,547	03/07/2002	Hirokazu Morimoto	P 290737 TYHT-02S0039	9094

909 7590 05/06/2003

PILLSBURY WINTHROP, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER	
KIM, RICHARD H	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 05/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/091,547	MORIMOTO, HIROKAZU
	Examiner	Art Unit
	Richard H Kim	2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 07 March 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imabayashi et al. (US 6,535,264 B1) in view of Nishiyama et al. (US 6,507,385 B1).

Referring to claim 1, Imabayashi et al. discloses a device comprising a liquid crystal display panel which comprises (see col. 4, lines 63-65) which comprises a pair of substrates facing each other (see col. 11, lines 19-29), spacers formed on at least one of the substrate and configured to provide a clearance between the substrate (see col. 7, lines 42-40; Fig. 6, ref. BZ), and a liquid crystal material filling the clearance between the substrates (see Fig. 6, ref. LC), and a support member supporting the panel and configured to make the panel stand during use of the module (see Fig. 13), wherein, where the temperature of the panel is at 25 degrees Celsius (see col. 8, lines 6-10), the spacers are elastically deformed by pressure applied from the substrate (see col. 11, lines 14-29). However, the reference does not disclose that the spacer is columnar and that at 50 degrees Celsius, the spacer is still elastically deformed.

Nishiyama et al. discloses columnar spacers (see Fig. 1, ref. 4, ref. 3); and that at 50 degrees Celsius, the spacer is deformed (see col. 9, lines 29-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ columnar spacers since such a modification provides no added

advantage, is used for a particular purpose or solves a stated problem. Therefore, one of ordinary skill in the art at the time the invention was made would have expected Applicant's invention to perform equally as well with the circular spacers disclosed in Imabayashi because the spacers ability to maintain a consistent distance between the two substrates is not effected by the shape of the spacer. Moreover, having the spacer elastically deformed at 50 degrees Celsius would enable the spacer to still be in a state of deformation when the area between the substrate is increased at 50 degrees Celsius, thereby allowing the area to be further increased due to an additional rise in temperature while maintaining uniformity across the display, allowing for increased performance capability.

Referring to claim 9, Imabayashi et al. discloses a device comprising a liquid crystal display panel (see col. 4, lines 63-65) which comprises a pair of substrates facing each other (see col. 11, lines 19-29), spacers formed on at least one of the substrates and configured to provide a clearance between the substrates (see col. 7, lines 42-40; Fig. 6, ref. BZ), and a liquid crystal material filling the clearance between the substrates (see Fig. 6, ref. LC); and a support member supporting the panel and configured to make the panel stand during use of the module (see Fig. 13), wherein the spacers are elastically deformed at 25 degrees Celsius by applied pressure from the substrate (see col. 8, lines 6-10; see col. 11, lines 14-29). The reference further discloses that when the temperature rises, the liquid crystal expands due to increased temperature, enabling the spacer to change in height (see col. 9, lines 24-27). However, the reference does not disclose that the spacer is columnar and that H_o, H_1, β and ΔD_1 satisfy a relationship represented by the inequality:

$$H_o - H_1 + 25 * \beta * H_o > \Delta D_1,$$

Where H_0 represents a height of the spacers at 25 degrees Celsius under a state that the pressure is removed, H_1 represents a height of the spacers at 25 degrees Celsius under a state that the pressure is applied, β represents a linear expansion coefficient of the spacers, and ΔD_1 represents an increase in the distance between the substrates which is calculated from an increase in volume of the liquid crystal material caused by a temperature elevation from 25 degrees to 50 degrees Celsius.

Nishiyama et al. discloses columnar spacers (see Fig. 1, ref. 4, ref. 3); and that at 50 degrees Celsius, the spacer is deformed (see col. 9, lines 29-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ columnar spacers since such a modification provides no added advantage, is used for a particular purpose or solves a stated problem. Therefore, one of ordinary skill in the art at the time the invention was made would have expected Applicant's invention to perform equally as well with the circular spacers disclosed in Imabayashi because the spacer's ability to maintain a consistent distance between the two substrates is not effected by the shape of the spacer. Moreover, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the invention satisfy the relationship represented by $H_0 - H_1 + 25 * \beta * H_0 > \Delta D_1$, since manipulating a relationship with already known parameters to obtain optimum results requires routine skill in the art. Moreover, such an inequality would enable the spacer to still be in a state of deformation when the area between the substrate is increased at 50 degrees Celsius, thereby allowing the area to be further increased due to an additional rise in temperature while maintaining uniformity across the display, allowing for increased performance capability.

Referring to claim 15, Imabayashi et al. discloses a device comprising a liquid crystal display panel (see col. 4, lines 63-65) which comprises a pair of substrates facing each other (see col. 11, lines 19-29), spacers formed on at least one of the substrates and configured to provide a clearance between the substrates (see col. 7, lines 42-40; Fig. 6, ref. BZ), and a liquid crystal material filling the clearance between the substrates (see Fig. 6, ref. LC); and a support member supporting the panel and configured to make the panel stand during use of the module (see Fig. 13), wherein the spacers are elastically deformed at 25 degrees Celsius by applied pressure from the substrate (see col. 8, lines 6-10; see col. 11, lines 14-29). The reference further discloses that when the temperature rises, the liquid crystal expands due to increased temperature, enabling the spacer to change in height (see col. 9, lines 24-27). However, the reference does not disclose that the spacer is columnar and that H_o, H_1, and ΔD_1 satisfy a relationship represented by the inequality:

$$H_o - H_1 > \Delta D_1,$$

Where H_o represents a height of the spacers at 25 degrees Celsius under a state that the pressure is removed, H_1 represents a height of the spacers at 25 degrees Celsius under a state that the pressure is applied and ΔD_1 represents an increase in the distance between the substrates which is calculated from an increase in volume of the liquid crystal material caused by a temperature elevation from 25 degrees to 50 degrees Celsius.

Nishiyama et al. discloses columnar spacers (see Fig. 1, ref. 4, ref. 3); and that at 50 degrees Celsius, the spacer is deformed (see col. 9, lines 29-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ columnar spacers since such a modification provides no added

advantage, is used for a particular purpose or solves a stated problem. Therefore, one of ordinary skill in the art at the time the invention was made would have expected Applicant's invention to perform equally as well with the circular spacers disclosed in Imabayashi because the spacers ability to maintain a consistent distance between the two substrates is not effected by the shape of the spacer. Moreover, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the invention satisfy the relationship represented by $H_o - H_l > \Delta D_1$, since manipulating a relationship with already known parameters to obtain optimum results requires routine skill in the art. Moreover, such an inequality would enable the spacer to still be in a state of deformation when the area between the substrate is increased at 50 degrees Celsius, thereby allowing the area to be further increased due to an additional rise in temperature while maintaining uniformity across the display, allowing for increased performance capability.

Referring to claims 4 and 12, Imabayashi et al. and Nishiyama et al. disclose the device previously recited. However, Imayabashi et al. does not disclose that the temperature of the panel rises from 25 to 70 degrees Celsius and wherein H_o, H_l, β and ΔD_1 satisfy a relationship represented b an inequality:

$$H_o - H_l + 45 * \beta * H_o > \Delta D_2,$$

where ΔD_2 represents an increase in distance between the substrates which is calculated from an increase in volume of the liquid crystal material caused by a temperature elevation from 25 to 70 degrees Celsius.

Nishiyama et al. discloses a device wherein the temperature of the panel rises from 25 to 70 degrees Celsius, causing an expansion of the liquid crystal material resulting in an increase

volume between the two substrates (see col. 11, lines 1-8, col. 9, lines 28-30); and that at 70 degrees Celsius, the spacer is still elastically deformed (see col. 9, lines 29-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the temperature of the panel rise from 25 to 70 degrees Celsius since one would be motivated to increase the elastic range of the spacer. By having the panel rise from 25 to 70 degrees Celsius, the substrate would be able to maintain a display with no "nonuniformity of the cell thickness" (see col. 9, lines 43-45), at a greater temperature. Moreover, manipulating a relationship with already known parameters to obtain optimum results requires routine skill in the art. Further, such an inequality would enable the spacer to still be in a state of deformation when the area between the substrate is increased at 70 degrees Celsius, thereby allowing the area to be further increased due to an additional rise in temperature while maintaining uniformity across the display, allowing for increased performance capability.

Referring to claim 18, Imabayashi et al. and Nishiyama et al. disclose the device previously recited. However, Imayabashi et al. does not disclose that H_o, H_1 and ΔD_2 satisfy a relationship represented b an inequality:

$$H_o - H_1 > \Delta D_2,$$

where ΔD_2 represents an increase in distance between the substrates which is calculated from an increase in volume of the liquid crystal material caused by a temperature elevation from 25 to 70 degrees Celsius.

Nishiyama et al. discloses a device wherein the temperature of the panel rises from 25 to 70 degrees Celsius, causing an expansion of the liquid crystal material resulting in an increase

volume between the two substrates (see col. 11, lines 1-8, col. 9, lines 28-30); and that at 70 degrees Celsius, the spacer is still elastically deformed (see col. 9, lines 29-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the temperature of the panel rise from 25 to 70 degrees Celsius since one would be motivated to increase the elastic range of the spacer. By having the panel rise from 25 to 70 degrees Celsius, the substrate would be able to maintain a display with no "nonuniformity of the cell thickness" (see col. 9, lines 43-45), at a greater temperature. Moreover, manipulating a relationship with already known parameters to obtain optimum results requires routine skill in the art. Further, such an inequality would enable the spacer to still be in a state of deformation when the area between the substrate is increased at 70 degrees Celsius, thereby allowing the area to be further increased due to an additional rise in temperature while maintaining uniformity across the display, allowing for increased performance capability.

Referring to claims 2, 5, 7, 10, 13, 16 and 19, Imabayashi et al. and Nishiyama et al. disclose the device previously recited. Imabayashi et al. further discloses that liquid crystal device further comprises a light source configured to irradiate the panel with light (see Fig. 11, ref. BL), wherein a highest temperature reached by the panel by continuously light the light source is equal to or lower than 70 degree Celsius (see col. 8, lines 7-8). However the reference does not disclose that the highest temperature reached by the panel by continuously light the light source is equal to or lower than 50 degree Celsius.

It would have been obvious to one having ordinary skill in the art for the highest temperature reached by the panel by continuously light the light source is equal to or lower than 50 degree Celsius since such a modification would allow enough heat for the liquid crystal to

expand, and therefore enable deformation of the substrate. Either temperature would allow the invention to operate and reduce the irregularity of the screen (see col. 7, line 57), and therefore would be functionally equivalent.

Referring to claims 3, 6, 8, 11, 14, 17 and 20, Imabayashi et al. and Nishiyama et al. disclose the device previously recited. However, the references do not disclose that the display region has a diagonal dimension equal to or longer than 12 inches.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the display region have a diagonal dimension equal to or longer than 12 inches since such dimensions on a display region is well known in the art. Moreover, according to Imabayashi, the intended problem to be solved by the given invention is for relatively large display screens. Therefore, such a limitation would enable the invention to improve picture quality of the display region by reducing the irregularity of the screen (see col. 7, lines 57).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard H Kim whose telephone number is (703)305-4791. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703)305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Richard H Kim
Examiner
Art Unit 2882

RHK
April 30, 2003

David Bruce

DAVID V. BRUCE
PRIMARY EXAMINER